

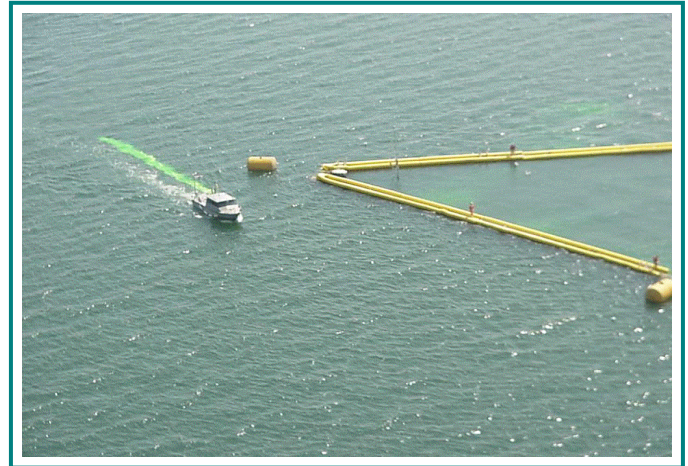


**US Army Corps  
of Engineers®**  
Engineer Research and  
Development Center

# Rapidly Installed Breakwater System

## Technology

The Rapidly Installed Breakwater System (RIBS) is a floating breakwater made of high-strength marine fabrics within a V-shaped structure. Its main feature is its hydraulically pressurized fabric beams that extend from the surface of the water toward the bottom. When deployed, the tip of the V spreads and reflects incoming waves away from the interior of the V, providing a sheltered area inside the V and in the lee of the structure. Ships and lighterage are then moored in the lee of the V for offloading. Depending on the specific location where RIBS is set up, the length of the legs of the V will vary, but may range between 700 and 1,000 ft. The nose design allows the legs to be linked together and stream directly behind when RIBS must be towed to alternate locations or be free streamed to survive storm events such as hurricanes. Mooring loads are minimized since the structure is designed to deflect rather than absorb waves.



## Problem

For many years, the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory has been involved with the design and deployment of floating breakwaters, primarily for application within bays or estuaries that are semiprotected from large waves. Such structures are intended to reduce waves of up to 4 ft and which do not exceed 4 sec. RIBS represents a significant advancement in floating breakwater technology because it is effective for wave periods up to 8 sec. It is being developed to lessen the impact of elevated sea states when equipment and supplies are being projected in support of military operations requiring logistics-over-the-shore (LOTS) operations or limited Intra-theater Sealift Operations. Collectively, LOTS operations involve the transfer of cargo from sealift ships to lighters and then to shore, either directly across a bare beach or through smaller existing ports. These operations are extremely difficult when vigorous seas limit the capabilities of ship-based crane operators and stevedore crews. The primary problem occurs in key offshore areas or anchorages where containerships and roll-on/roll-off vessels discharge cargo and unit equipment onto much smaller vessels or lighterage. In many areas of the world the major ports to which military sealift ships might deploy may be denied by enemy activity or may be physically unsuited to receive large ships. For this reason, the U.S. Army's ability to get equipment and supplies ashore using a LOTS operation constitutes a key-limiting factor for executing war plans and sustainment operations. This is particularly true when the operations must be conducted in mildly energetic seas, such as Sea State 3 (SS3), in which significant wave heights range from 3 to 5 ft.

**Expected Cost  
To Implement**

At present, RIBS is a Department of Defense specific system designed only for military applications, although a smaller version with commercial applications is projected for the future.

**Benefits/Savings**

Results from analytical, laboratory, and field tests indicate that RIBS can reduce 3-to5-ft waves by more than 50 percent. The present focus on global maneuver and strategic focus creates the requirement to be capable to rapidly project the Objective Force. With RIBS, the U.S. military services can expect to greatly increase operational capabilities of conventional LOTS throughput from Sea State 2 to Sea State 3. This nets an increase of 50 percent more LOTS operating time in the Persian Gulf and the Sea of Japan. In other geographic areas, the increase in LOTS operating time is up to 180 percent of the present baselines. RIBS also has potential to be used in connection with the Theater Support Vessel if it is ever loaded under in-the-stream conditions.

**Status**

A full-scale 400-ft test section was fabricated and deployed in the vicinity of Fort Pierce, Florida, in December 2001. The model, called RIB XM-2001, was fabricated in Torrance, California, and shipped to the test site in Fort Pierce aboard three ordinary tractor-trailers. The RIB XM-2001 featured hydraulically pressurized beam technology, a Deployment and Recovery Mechanism for launching and recovering the XM-2001. The primary focus of the XM-2001 field study was to obtain experience with the handling/maneuvering/mooring requirements for a fabric structure of this size. The XM-2001 and the DRM both performed as designed and were used during the FY 02 ATD Field Demonstration. RIBS was the featured product of an Advanced Technology Demonstration that began in 1999 and concluded with a full-scale demonstration conducted in the fall of 2002 in the vicinity of Port Canaveral, Florida.

**ERDC POC**

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**Available  
Documentation**

RIBS research is being conducted as part of the USACE Military Engineering RDT&E Program of the Coastal and Hydraulics Laboratory. Additional information can be found at the CHL Web site:

[http://web2000.wes.army.mil/chl/CMP/RIBS\\_pages/RIBS\\_Home.htm](http://web2000.wes.army.mil/chl/CMP/RIBS_pages/RIBS_Home.htm).